About Dark Matter and the Nature of Elementary Particles

By: Gerhard Jan Smit and Jelle Ebel van der Schoot, November 20, 2016.

Summary

In this article a particle will be presented through which all forces are explained in a satisfactory way. It concerns the so-called dimensional basic (db or 人). After much reflection, Gerhard Jan Smit and Jelle Ebel van der Schoot are of the opinion that with this theory, the foundation of the observed particles and forces has been found.

The accompanying formula is: $\sqrt{x^2 + y^2 + z^2} \times Kr = 1$ (0).

In the formula Kr = curvature [m^{-1}], x,y,z are coordinates in space/time [m].

Implications:

- The properties of dark matter can be described with the introduction of the dimensional basic, this introduction leads to new deductions in various fields of physics;
- the observed cosmic redshift is a gravitational redshift;
- the cosmic background is formed through the mutual interactions of the 1-db-particles;
- neutron consists -notwithstanding the current insights- of a foursome of quarks (2 quarks up, 2 quarks down);
- complex particles -rationalized from the basis- can be mathematically determined and simulated;
- the entanglement of particles is caused by curvatures, changes that one of the "partner-particles" experiences will instantaneously be experienced by the other "partner-particle(s)";
- electromagnetic fields around energized wires are being caused by aspirating 1-db particles. By winding of an energized wire in a coil the electromagnetic fields are being cumulated, this resulting in the fields as observed around an energized coil.

Introduction

It seems an impossibility to indicate the properties of a macroscopic object using quantum logic. The properties of microscopic elementary particles that are known at this time make this very difficult. Elementary particles have properties that cannot be defined, or only in a complex way. One significant problem is that the gravity at the level of the elementary particles will not be straight-jacketed into the Standard Model (Newton). If this happens, the "Theory of Everything" has been found; the theory which can merge the known forces of nature.

Now, for the first time, a particle will be presented in this article through which all forces are explained in a satisfactory way. It concerns the so-called dimensional basic (db or 人). After much reflection, we are of the opinion that with this basic particle, the foundation of the observed particles and forces has been found.

In this article we start with an outline of the observed conflicts within quantum mechanics. After that, the theory will be described, the dimensional basic followed by the consequences for the photon, the electron, the quarks, the protons and neutrons, the more complex particles and the nature of electromagnetic fields. We will finish with a short expression of euphoria (Beauty in the order) and a justification.

Quote by Einstein:
"Imagination is more important than knowledge. For knowledge is limited to all we now know and understand, while imagination embraces the entire world, and all there ever will be to know and understand."

Outline of observed conflicts within quantum mechanics

In the macroscopic world, facts (position, speed, and time) are true facts. In the microscopic world, one cannot often say that these are true or untrue. This begs the question: how well do we understand the world at the atomic scale? For example, Werner Heisenberg claimed: *"The subatomic world demonstrates again and again that we live in a psychedelic world that, to our common sense, is completely absurd."*

According to the current models, the world is made up of particles; this includes electrons, protons, and neutrons. Protons and neutrons are made up of constituent particles (quarks). Particles move under the influence of forces. Recognizable are short distance forces (strong and weak interactions) and long distance forces (electric and gravitational interactions).
The electric, weak and strong forces are dominant at the atomic and subatomic levels. There has been considerable progress in the search for a united theory of these forces. The description of all these particles and forces takes place within quantum mechanics.
Quantum mechanics is not just another physical theory; it is a framework for all physical theories. Quantum mechanics describes the nature of the particles and the forces that interfere with each other from the particles.

To date, no other theory besides quantum mechanics has the potential to ultimately reach the status of universal applicability. The mystery of quantum mechanics begins when you look more closely at the currently known foundation.

In order to study the smallest building blocks of matter, particle accelerators are used. In this method, elementary particles are artificially accelerated and brought into collision with other particles, creating new particles. Through observation of their tracks, whether or not deflected into a magnetic field (only electrically charged particles) and mutual collisions, the properties of the particles can be studied. Does this provide us with a good picture of the world, or is our picture a description of the results of these multiple experiments? Do the experiments supply a good fundamental description of the entity of the particles? Such a question is a source of unease among physicists.

Scientists would like an interpretation of quantum mechanics that corresponds with the experience in the macroscopic world *and* that is represented by classic mechanics. However, the classic world is in part not consistent with the world of quantum mechanics. This leads to essential questions. Can the universe be represented by quantum mechanics? It seems a reasonable expectation that the atoms in the universe would obey the laws of physics. Currently this doesn't seem to be the case.

First of all, on the <u>macro level</u> there are observations of deviating speeds in galaxies. These speeds do not correspond with the directly observed matter and can only be explained by the presence of unknown mass called dark matter. From data of gravitational lenses there is strong evidence as to the presence of dark matter. These data suggest the presence of dark matter in clusters and around galaxies. Although this matter has not actually and directly been observed, the indirect evidence is overwhelming.

Still, for many scientists it is hard to stomach the assumption of the presence of this unverifiable dark matter. Because of this, new theories are constantly emerging. Many of these theories are a typical result of scientists coming to a standstill because they cannot reconcile these observations on a macro level with the lack of real and direct evidence. The mathematical bag of tricks is turned upside down, and extremely complex claims are used to depict reality. Upon closer examination, one realizes that these do not remove the friction.

On a micro level too, the questions are fundamental. For example, within quantum mechanics there is the unexplained phenomenon of entanglement. Two particles that simultaneously come into being – but are situated at a great distance from each other – each turn out to possess properties that correspond with each other. This would bring to mind a common cause in the classic sense. However, if the situation changes for one of the particles (e.g. the spin), then the situation will simultaneously change for the other particle. It seems as if from a distance, an instantaneous transmission of information takes place. So this correlation between the two particles ostensibly goes beyond what is considered possible in classic physics. The fact that a particle does not choose a specific state until its observation (measuring) brought Einstein to remark: *"God does not play dice."* It is clear that Einstein meant that there must be an underlying, understandable reason for the presumed transmission of information. However, to this day, a satisfactory explanation for this phenomenon has not been found.

There are also questions in which micro level and macro level both play a role. First of all, there is the attraction of a photon by a gravitational field. A photon is deflected in its track by a heavy mass in space (Figure 1). Why does the photon obey to Einstein's ideas of curved space/time? Traditionally the photon is considered to be massless, the reason why the underlying mechanism has not yet been fully understood. Then there is the gravitational redshift that a photon (in space) undergoes when close to an object with an enormous curvature (black hole). In fact, on the event horizon of a black hole, the redshift becomes extreme (infinite). Although both of these phenomena have been universally accepted and observed, there is no full comprehension. Why does the photon undergo such a deflection and what is the mechanism of the gravitational redshift?

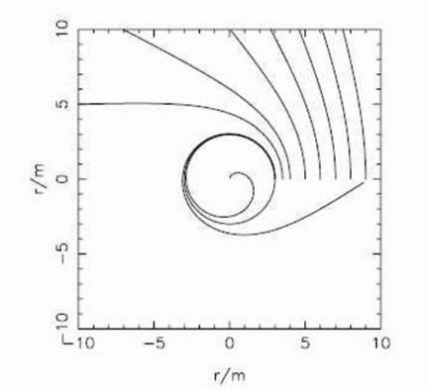


Fig. 1 (Deflection photon close to an object with a heavy mass)[1]

These and other matters lead physicists to constantly re-evaluate the interpretation of quantum physics. Their mutual goal is always to find a reformulation of the existing framework.

In this article, we propose a theory that, in fact, forms the foundation for the understanding of nuclear forces both on the micro as well as the macro scale. For the observed phenomenon's, we offer an unconventional explanation. Will the previously mentioned pressing questions be answered? We believe so.

In this article, we will make a number of assumptions that will fit the model we propose.

Dimensional Basic

The basis of the theory is: The most elementary particle in existence is the dimensional basic. This particle has only one property: An infinite curvature in the center. The particle itself has no dimensions (no length, no width, no heights). The particle is found everywhere in the universe. The particle is always moving through space/time. Through agglomeration, or rather joint interaction, the particles form phenomena that at a certain moment rise above the observational limit. The db itself

exists below the observational limit and so it can never be demonstrated. The 1db-particle is depicted in Figure 2. Curvature has been plotted here against space/time.

The accompanying formula is: $\sqrt{x^2 + y^2 + z^2} \times Kr = 1$ (0).

In the formula Kr = curvature [m^{-1}], x,y,z are coordinates in space/time [m].

The curvature of space on the location of the 1-db is infinite, while time stands still on the location of the 1-db. The 1-db behaves like a black hole without dimensions. Formula (0) describes the relatively reduced extent of curvature of space/time surrounding the 1-db. The curvature of space will reduce and time is running faster as the distance to the 1-db enlarges.

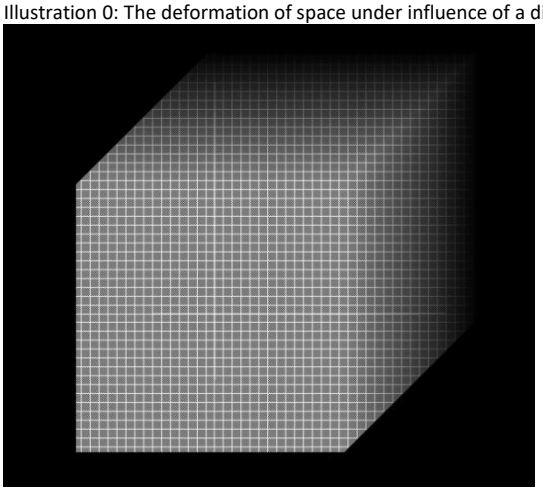
The distance between the 1-db's varies by movements relative to each other. The directions of movements are being influenced by one another according to mathematic laws. The movement paths are optically influenced for the outside observer by the curvatures of space/time caused by the db's themselves. This means that times slows down while relative space around a 1-db becomes smaller when the db's are approaching each other. Time speeds up and relative space around a 1-db becomes larger when the db's go from one another.

The db is set apart from other particles in the sense that other particles are composed of multiple db's while the db itself is a singular particle. Also singular in respect to singularity. Each db is a singularity on itself, other particles than the db are a combination of multiple singularities.

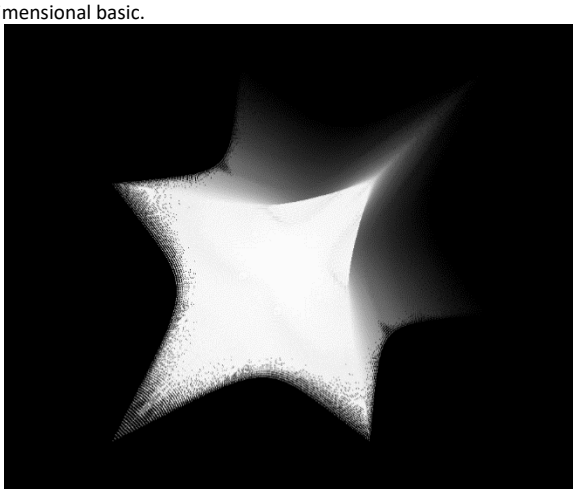
Observed forces (weak, strong, electric) have the same origin. These forces find their cause in the character of a singular db. The observed forces are in fact a very complex sum of circling movements that will come to exist when multiple db's get into an interaction with each other.

Formula (0) was correctly applied in the static model simulations[4] we used for the illustrations and time deformation has been applied in the dynamical model that was developed which could not be shown in the article. Output of the dynamical model can be seen on the website www.dbphysics.com .

Illustration 0: The deformation of space under influence of a dimensional basic.



0.1 Uncurved (flat) cube of space/time



0.2 Cube of space time curved by the presence of a dimensional basic in the centre

For this article we use a simplification of formula (0): Kr = abs $\frac{1}{x}$ (1).

In the formula Kr = curvature [m^{-1}], x = space/time [m].

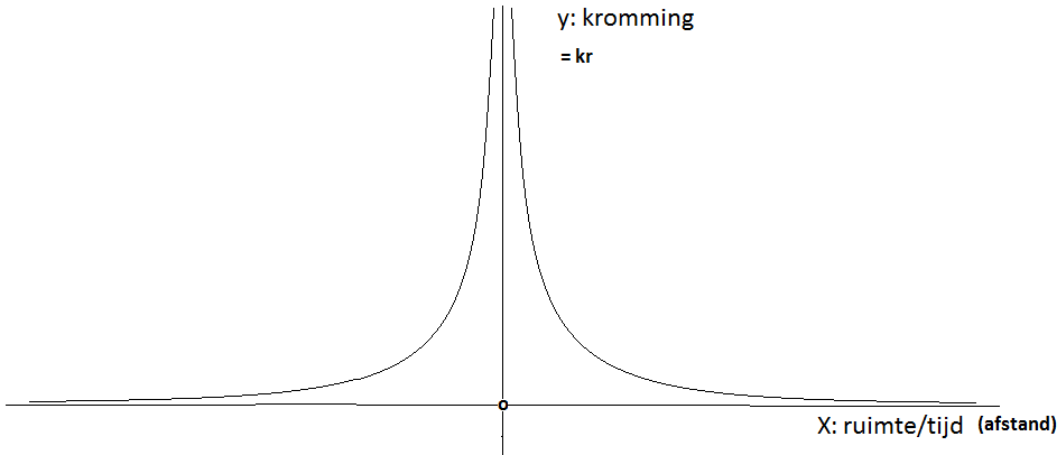


Fig. 2 (Schematic depiction 1db)[3]

When two 1-db-particles enter into the direct sphere of influence of each other's curvature, a strong interaction will be formed between the two. This is comparable to a star-planet combination such as the sun and the earth (Illustration 1.1). The difference is that the 1-db-particles are without a dimension and with an infinite curvature in the center (Illustration 1.2). This indicates that time (for the outside observer) infinitely slows down when the particles approach each other. So the combination of the 2db's has an enormous life span. The interaction between the two 1-db's is depicted in Figure 3. The analogy of the curvatures around black holes is striking.

Illustration. 1.1. Earth in curvature field of sun[2]

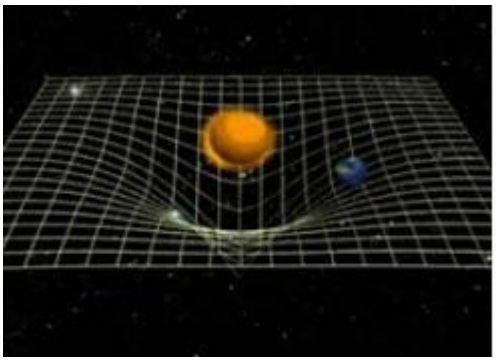
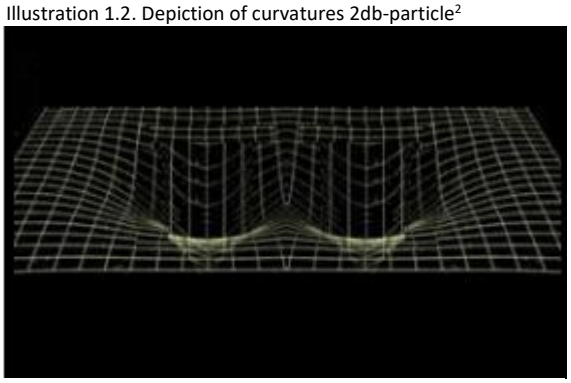


Illustration 1.2. Depiction of curvatures 2db-particle[2]



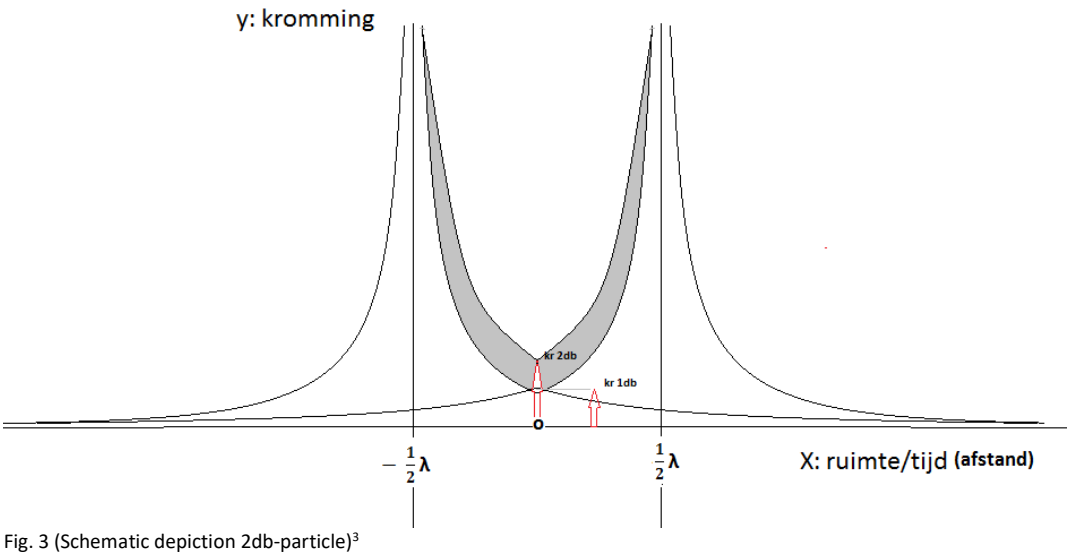


Fig. 3 (Schematic depiction 2db-particle)[3]

The curvature of the combined particles is found using the formula (2). The curvature in the center between the particles is found when x=0.

$$kr = \text{abs}\frac{1}{x+\frac{1\lambda}{2}} + \text{abs}\frac{1}{x-\frac{1\lambda}{2}} \quad (2).$$

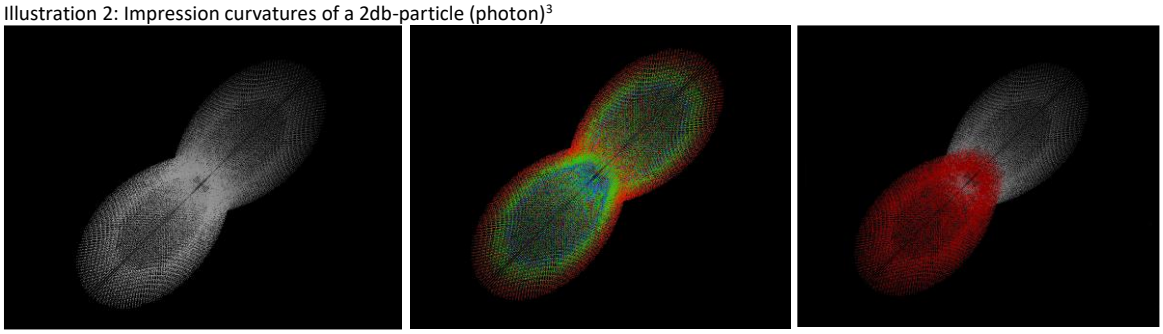
In the formula Kr = curvature [m^{-1}], λ = distance between both particles/wavelength [m].

The resulting established surface between both asymptotes has a surface of $2 * \int_{0,5\lambda}^{\lambda} \ln(x)$. This is equal to $2 \ln 2$ (constant). The total surface (this is the surface in which the results on the left and right side of the graphic have been incorporated) has the value of $2\ln(2) + 2* \int_{\lambda}^{\infty} \frac{1}{x} dx$.

The photon

The hypothesis is that the 2-db-particle is a photon. A depiction of curvatures that the observer can detect is shown in Illustration 2. The wavelength of the photon is equal to the distance λ between both particles. The schematic depiction of a photon is shown in Figure 4.

Illustration 2: Impression curvatures of a 2db-particle (photon)[3]



2.1 Photon (greyscale) **2.2 Photon (blue is high curvature, red is low curvature)** **2.3 Photon (each db it's own color)**

In a photon in the red spectrum (620 nm) the kr_{620nm} (when x=0) has a value of 6.45×10^6 m^{-1}. For a gamma-photon (0.001 nm) the $kr_{0,001nm}$ (when x=0) has a value of 4.0×10^{12} m^{-1}. The surface is equal for each photon $2\ln(2) + 2* \int_{\lambda}^{\infty} \frac{1}{x} dx$. This indicates that the enthalpy will be equal for all photons. However, the entropy of a photon does increase as its wavelength increases. This becomes clear through a reduction of the curvature at a larger wavelength.

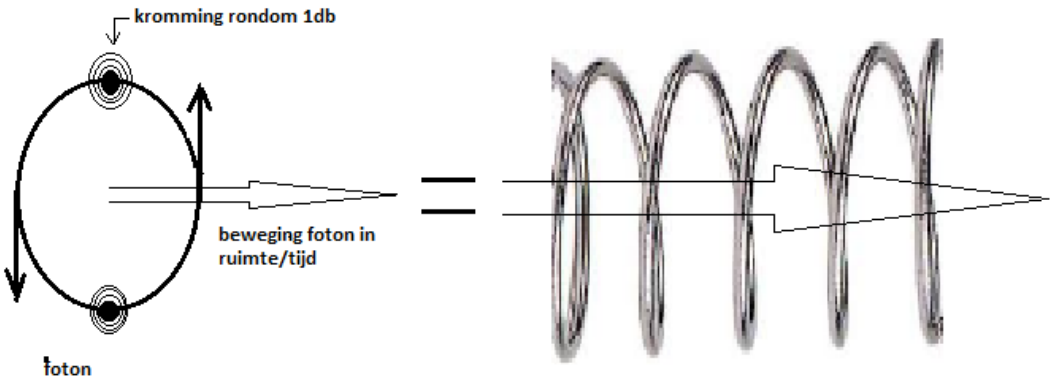


Figure 4. (Schematic depiction photon)[3]

It is clear that a moving 2-db-particle – under the influence of a nearby object with an extreme curvature – will have a deflected track. This is in fact what is observed (see Figure 1).

Let's look at another phenomenon. If a photon on its track is influenced by curvatures caused by other particles, the photon will be brought out of balance, i.e. the enlargement of the radius of its internal circular movement. Under the influence of extreme curvatures, the photon will undergo a wavelength shift. We call this "the aging of the photon." Because both db-particles experience an enormous curvature via each other within the photon, this is an extremely slow process for the observer. But during a trip through space/time lasting many light-years (e.g. 10 billion light-years) the effect can be seen by the observer.

The redshift at a certain moment in time is given through the following formula (3):

$$\lambda_{observer} = \lambda_{standard} + Constant \times S \quad (3)$$

In the formula $\lambda_{observer}$ is the wavelength of the photon [nm] at the position of the observer, $\lambda_{Standard}$ is the wavelength of the photon [nm] on it's place of birth, the Constant is a space-constant that is due to the fluctuating curvatures that the photon will meet on its way through space/time, S is the traveling distance of the photon in space/time between the place of birth and the position of the observer [m].

Because the photon will go on a long journey through various curvature fields, the connection is of course not quite as linear as is suggested here. Figure 5 shows photons that have tracks through different curvature fields. Note that the photon 1 on t_{10} has a different position in space/time than photon 2 on t_{10}. To the outside observer, photon 1 seems to move faster.

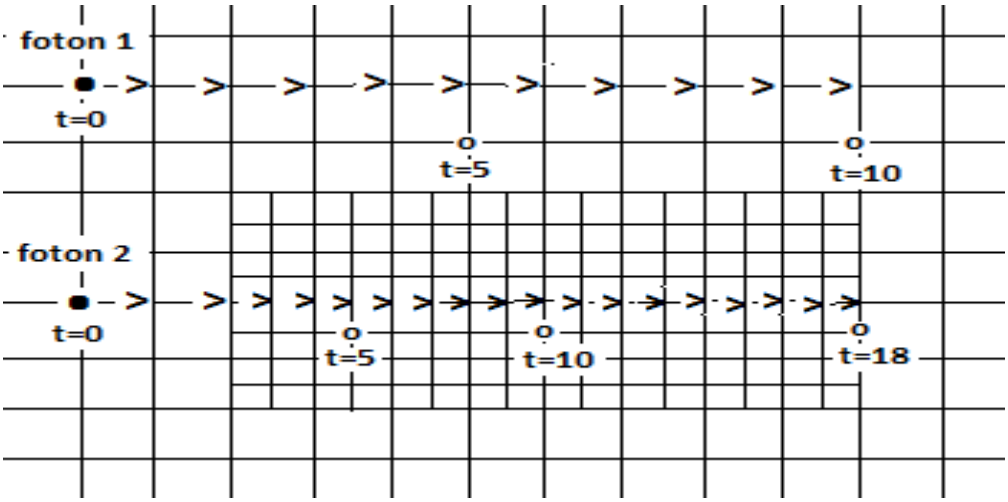
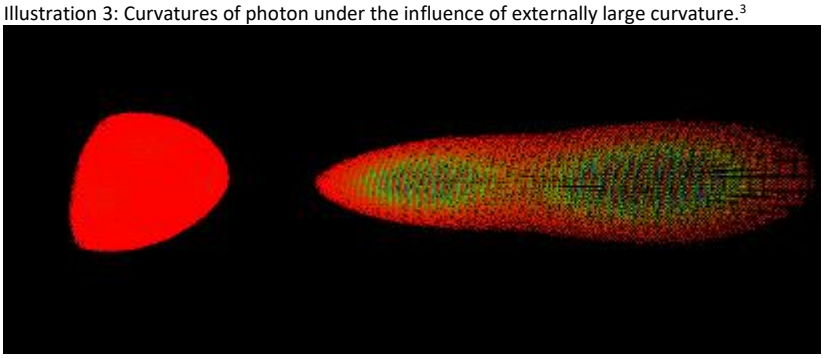


Fig. 5 (Photon in a track through different curvature fields)[3]

Under the influence of extreme curvatures in space, the "aging" of a photon can accelerate greatly. This is observable near black holes (see Illustration 3). The closer the track of a photon to a black hole, the greater the aging. In fact, close to an event horizon (Schwartschild scale) of a black hole, the aging (gravitational redshift) is infinite.

Illustration 3: Curvatures of photon under the influence of externally large curvature.[3]



To date, the observed cosmic redshift in the universe has been explained mostly through the hypothetical expansion of the universe. The redshift is explained as a Doppler effect. We are of the opinion that cosmic redshift is the result of the aging of the photon. This effect takes place when photons have traveled extreme distances (e.g. 10 billion light years) in space/time. As mentioned before, the aging of the photons is caused by the proximity of curvatures which the photon encounters in transit. As previously stated, these curvatures are present everywhere in the universe as db's. The observed redshift is in fact a gravitational redshift. A direct conclusion could be that there is no such thing as an expansion of the universe. The observations of a seemingly accelerated expanding universe are being explained by the 'aging of the photon' and thus we have doubts concerning the hypothesis of dark energy being responsible for the expanding of the universe at an accelerating rate.

It is important to note that the large amounts of db's are responsible for the observed presence of dark energy and dark matter. The db's are in fact the sought after dark matter. This can explain the deviating speeds of galaxies without anyone having to dust off the mathematical bag of tricks. The movements in space can be explained in a Newtonian way.

The by Einstein suggested cosmological constant in the theory of relativity is in fact a resumptive description of the presence of dimensional basics. Einstein later on rejected his own suggestion on the basis of "Hubbles Law". We are of the opinion that his suggestion indeed was right.

The dimensional basic plays a crucial role in the explanation of fluctuations in the spectrum of cosmic background radiation. The matter responsible has never before been observed. We believe that some types of the cosmic background are formed through the mutual interaction of the 1db-particles. This sometimes causes photons of completely different wavelengths to be formed, which together cause the pattern of cosmic background radiation.

Electrons

Observations have shown that a positron and an electron are annihilated, which causes two gamma-photons to be released. This is depicted in the Feynman diagram below (Figure 6).

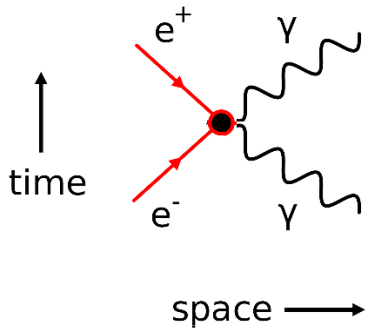


Fig. 6 (Feynman diagram annihilation positron and electron)[3]

The Feynman diagram can also be read in reverse. Two gamma-photons together form a positron and an electron. Each of the photons is made up of two db-particles with only a rotation around the y-axis (see Figure 4). The electron is a 2db-particle with an extra spin (towards the photon) around the x-axis (clockwise). The positron is also a 2db-particle with an extra spin around the x-axis, but counter-clockwise. This is depicted in Figure 7. The photon is easy to imagine as a plate. The electron (or positron) can be imagined as a sphere.

At a confrontation between an electron and a positron, a true annihilation does not take place. However, an "extinguishing" of both spins does take place in which the 2db-particles start to behave like gamma-photons. So this still refers to the same 2db-particles.

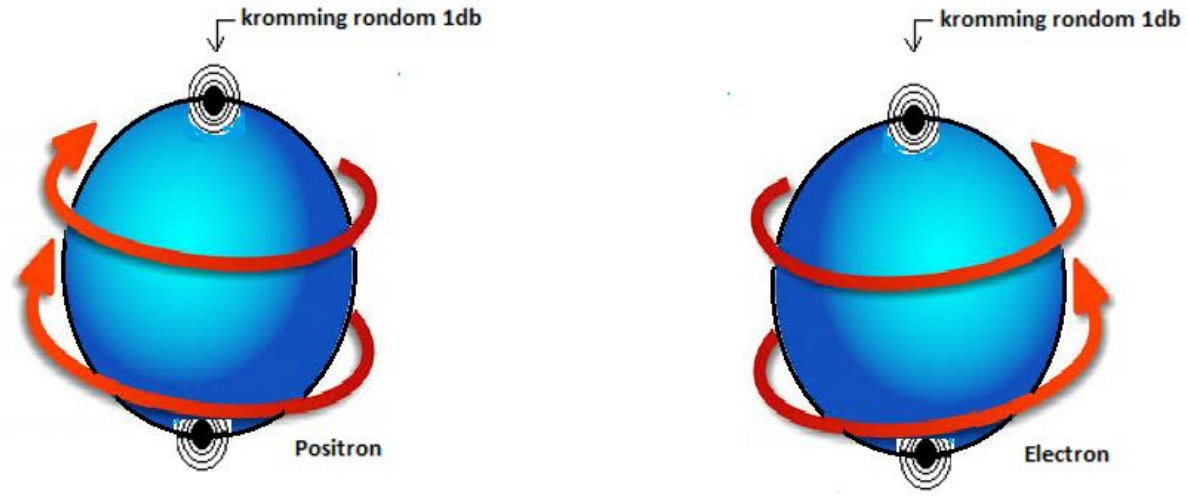


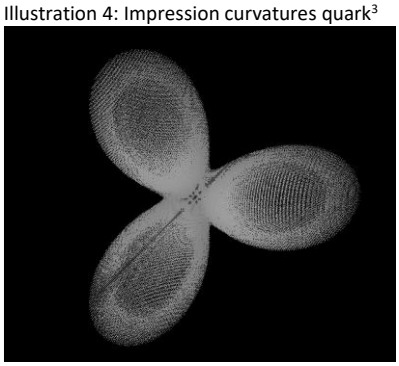
Fig. 7. (Schematic depiction electron and positron)[3]

Quarks, protons, and neutrons

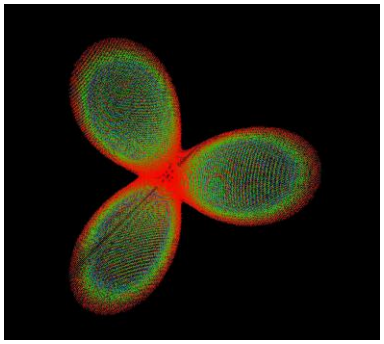
Literature describes quarks as constituent particles. The quarks can occur in various ways. In a proton or a neutron one can see multiple quarks that are oriented up or down. A proton is known to consist of three quarks, 2 of which are up (2 Qu) and 1 down (1 Qd).

In our view, a quark is an interaction between three 1-db's. A depiction of curvatures which can be seen by the observer is shown in Illustration 4.

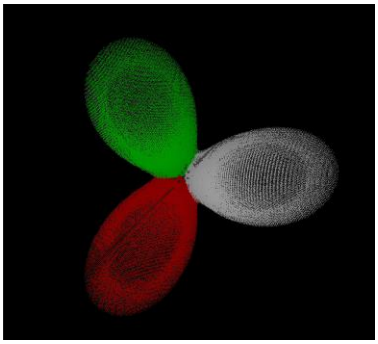
Illustration 4: Impression curvatures quark[3]



4.1 Quark (greyscale)



4.2 Quark (blue is high curvature red is low curvature)



4.3 Quark (each db it's own color)

A neutron is unstable and rapidly dissociates into an electron, a proton, and an electron-anti-neutrino.

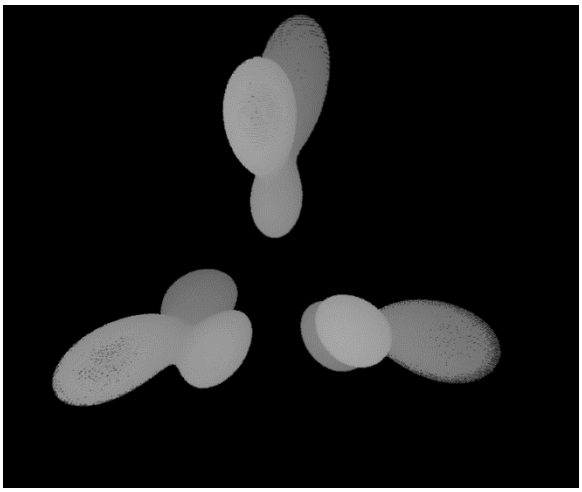
$$\mathrm{n} \rightarrow \mathrm{p} + \mathrm{e}^{-} + \bar{\nu}_e + 0{,}78\,\mathrm{MeV}$$

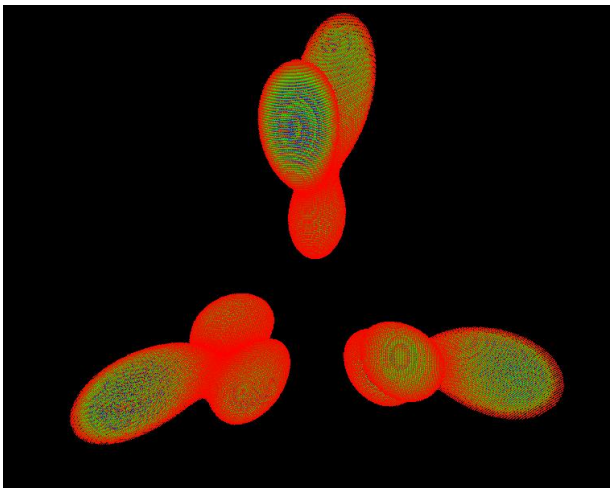
We infer from this comparison, on basis of our theory, that a neutron loses a quark during its disassociation into a proton. The withdrawing quark (that consists of three db's) is very unstable and will immediately disassociate into an electron (2-db) and an anti-neutrino (1-db). The anti-neutrino is in fact a 1-db-particle that leaves the system of three (3-db/quark) and in an ultra-short time displays an extra curvature in its immediate surroundings. This is observed as the anti-neutrino. The electron proves observable while the proton also forms.

We conclude from this that a neutron consists of a foursome of quarks. Of these, 2 quarks are up and 2 quarks are down. This also explains the fact that, different from the proton, the neutron does not show a positively oriented field. The disassociation into a proton takes place during the expelling of a down quark. This will be further explained shortly.

Thus, according to our theory, a neutron consists of two up-quarks and 2 down-quarks (Qu, Qd, Qu, Qd). A depiction of the curvatures within a neutron is shown in Illustration 6. A proton consists of two up-quarks and one down-quark (Qu, Qu, Qd). A depiction of the curvatures within a proton is shown in Illustration 5.

Illustration 5: Impression curvatures proton[3]





Concluding: during the disassociation into a proton, the following happens:

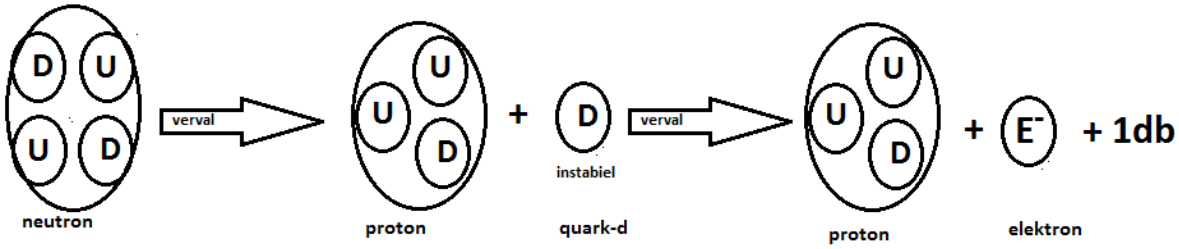


Figure 8 (Disassociation into proton, electron, and 1db)[3]

In principle, the proton is very stable. Yet it can be said that during the disassociation of a proton, according to our theory this will take place as follows:

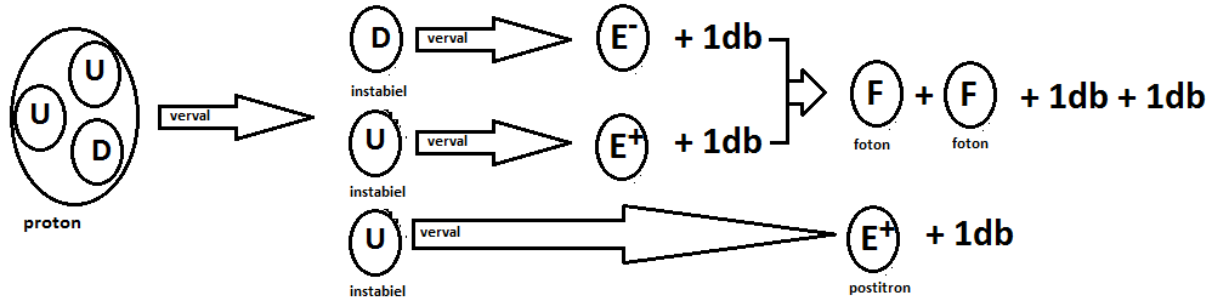
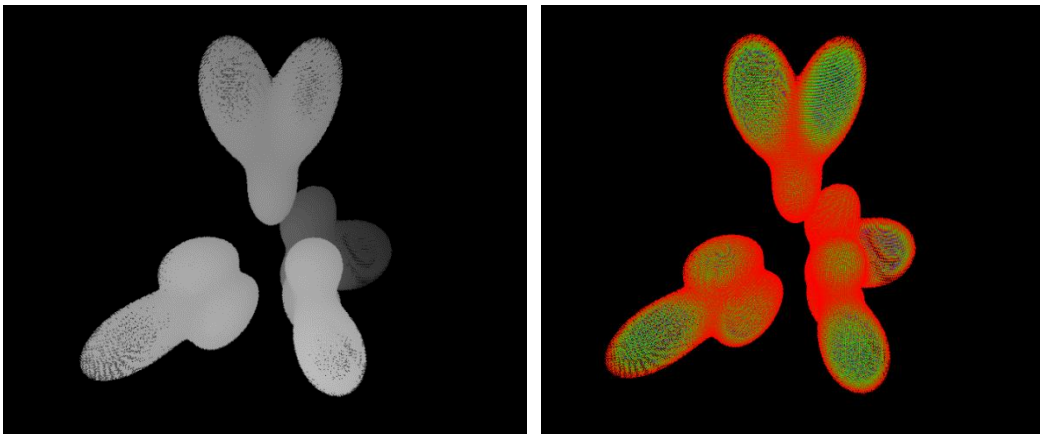


Fig. 9 (Disassociation into a positron, 2 gamma-photons, and 3x1db)[3]

At a disassociation, the proton will result in a positron, 2 gamma-photons, and three 1db-particles. In an ultra-short time, these 1db-particles will display an extra curvature in the immediate surroundings. These are observed as anti-neutrinos.

The described disassociation can in fact be observed by physicists. This provides our theory with evidence within the current observations.

Illustration 6: Impression curvatures neutron[3]

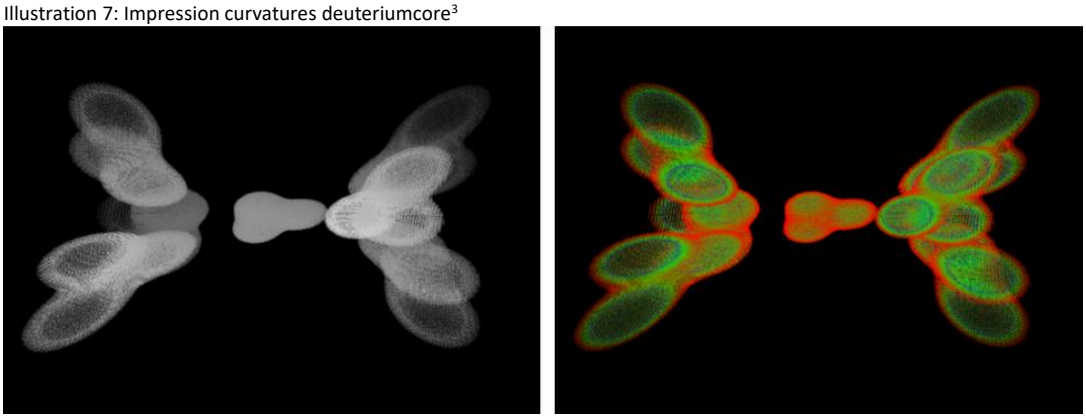


More complex particles

In more complex particles, the mutual interactions will become more and more complicated. We are of the opinion that these particles – rationalized from the basis – can be mathematically determined and simulated. Within these simulations we also expect that the previously mentioned

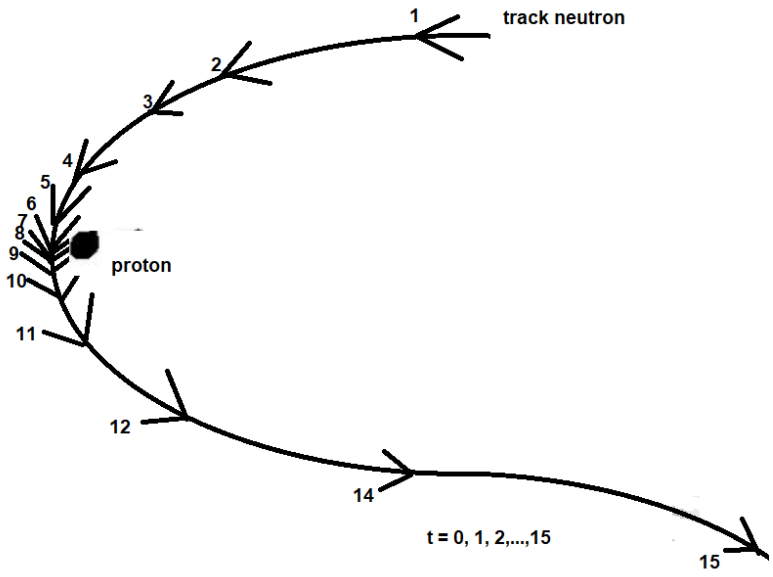
entanglements of particles can be explained. In our view, the entanglement is possible because particles (whether constituent or not) can be under the influence of each other's curvatures. This phenomenon can take place at very large distances. Such a situation will – caused by the relatively weak curvature – be unstable and experience a rapid disassociation. Because the entanglement is caused by curvatures, changes that one of the "partner-particles" experiences will instantaneously be experienced by the other "partner-particle." Thus, there is an underlying, understandable reason for the observed transmission (no playing dice).

Illustration 7: Impression curvatures deuteriumcore[3]



In illustration 7 the curvatures of a deuterium core are shown. To the left the proton, to the middle/right the neutron. Remarkable is that the quark in the middle seems to be smaller than the surrounding quarks, this is the effect of a locally enlarged curvature of space. The proton and the neutron within their own complex movement tend to the configuration as shown in illustration 7. In a Newtonian way they will approach each other as shown and then remove from one another. What appears to be instantaneous and linear in time and space for the proton and the neutron will appear to be a slow process for an outside observer. When the distance between the proton and the neutron becomes more narrow time is being slowed down. Time is speeding up again when the distance between the proton and the neutron gets bigger. At the nearest point there is a "anchor" which is the cause for the longevity of the deuterium core. The half-life of the deuterium is unknown. The deuterium core is relatively stable. The timing within the described process in depicted in illustration 8. In illustration 8 the proton is held statically. The observer is theoretically situated on the proton.

Illustration 8: Trajectory of a neutron to a proton[3]



Electromagnetic Fields

Electromagnetic fields around an energized wire behave like fluids within a centrifugal pump. The centrifugal pump has been developed in the end of the 17th century by Denis Papin. If the fan of a centrifugal pump begins to rotate the fluid within the fan will get a tangential speed (= speed in the direction of the periphery). The centrifugal force that hereby arises makes the fluid being pushed to the outer periphery of the fan. In this the mechanical energy (the rotation of the fan) is being converted into potential and kinetic energy. In analogy to, the electrons (who all have a likeminded spin) will be hurled to the outer periphery of the wire. On the outside of the wire the curvatures caused by the electrons will be large. Through these curvatures the 1-db particles will be sucked in. This causes a whirlwind of 1-db particles which will rotate around the energized wire. This causes the electromagnetic fields with their attractive force. This process is depicted in illustration 9. By winding an energized wire in a coil the electromagnetic forces are being cumulated, this resulting in the fields as observed around an energized coil. This process is depicted in illustration 10. When positrons are send through a wire the fields will show an opposite direction with respect to the fields caused by electrons.

Illustration 9: Electromagnetic fields around an energized wire[3].

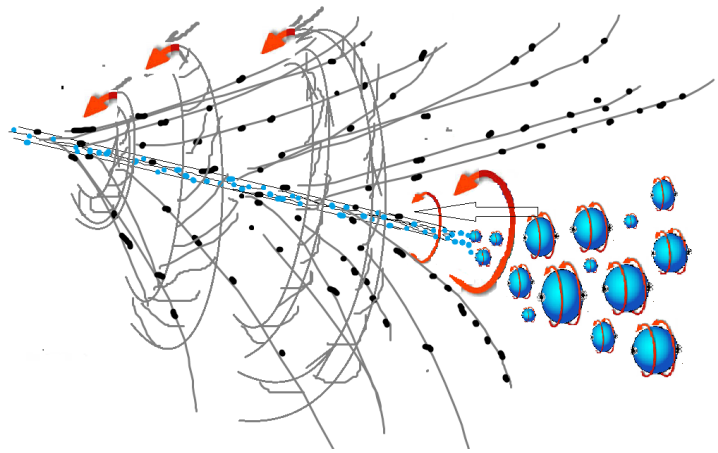
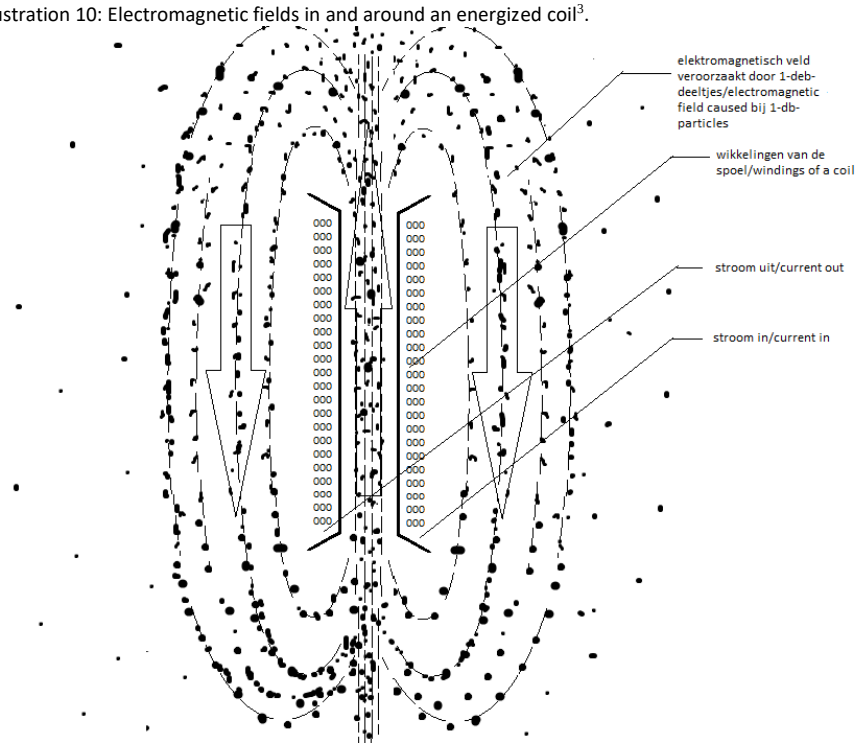


Illustration 10: Electromagnetic fields in and around an energized coil[3].



Beauty in the order

To us, this model constitutes a good candidate for a new foundation to represent the observed particles and forces. The short distance forces (strong and weak) and the long distance forces (electric and gravitational) can be explained from the described curvatures.

We are amazed by the simplicity and the beauty of all this. The first words "let there be light" (Genesis) are remarkable. The photon is the first reaction that rises above our observation level. After that, all phenomena can be derived according to a relatively simple concept. The world can be described with Newton and Einstein. Reflecting out of this basis, one arrives at explanations for a multitude of phenomena. All observed interactions can be explained using this simple model. This has in fact always been the expectation of the great physicists. A simple model that can explain the forces of nature. In our opinion, this theory realizes all expectations.

This discovery in the area of physics of elementary particles demonstrates that order is the basis of creation. We are of the opinion that we are looking at the fundamentals of the structure, but the mystery of life remains.

Acknowledgement

The dimensional basic was devised by Gerhard Jan Smit during the years 1986 to 1993. He shared the theory of the dimensional basic, the character of dark matter, electromagnetic radiation, electrons, quarks, curvature phenomena of complex particles, the relative variable speed of light through various curvature fields, the "aging" of a photon, the improbability of the hypothetical expansion of the universe, the dimensional basic's responsibility for the movement of galaxies and its responsibility for the cosmic background on 7 oktober 2016 with Jelle Ebel van der Schoot. Further deductions of the theory applying to photons, electrons, positrons, black holes, the cosmological constant and the deuterium core were developed jointly. Jelle Ebel van der Schoot has posited the theory of the proton and the neutron and their decay. In December 2016 Gerhard Jan Smit has calculated and described the properties of a deuterium core while on the 7th of January 2017 Jelle Ebel van der Schoot has found and described an explanation for electromagnetic fields, both starting from the present theory. All this has resulted in the present article.

[1]Fig. 1 is from: "Presentation Black Holes", John Heise, University Utrecht. [2]Illustration 1.1 is from Building Blocks of the Universe, Len Zoetemeijer. Illustration 1.2 is derived from Illustration 1.1
[3]The other figures and illustrations were produced by us. The impressions of the curvatures of a cube of space, photons, electrons, quarks, protons, neutrons and the deuterium core were made using the plotting program Einstein[4]. This program has been developed by Gerhard Jan Smit during 1996.

An important part of the contents of the section "Outline of observed conflicts within quantum mechanics" is based on "Review of Roland Omnés, The Interpretation of Quantum Mechanics", William Faris, November 1996. Insights on the universe were taken from the books "Het punt Omega", John Gribbin, 1988 and "Galaxies in the Universe", L.S. Sparke and J.S Gallagher III, 2007. The information on protons, neutrons, quarks, and the disassociation of particles is general information that can be found on Wikipedia. We express special gratitude to Democritus, Newton, Einstein, and for the remainder, to God, who does not play dice.

Authors: Gerhard Jan Smit, Jelle Ebel van der Schoot, 20 november 2016, Nijmegen, The Netherlands.
Translation: Christina Anna Sutton, Rockford, Illinois, USA.

Version 1.2 (adjustment 29/11/2016, concerning the surface of a photon)
Version 1.3 (adjustment 30/11/2016, concerning the surface of a photon)
Version 1.4 (adjustment 30/11/2016, introduction formula (0))

Version 1.5 (textual adjustment 5/12/2016 in the first sentence of paragraph “Dimensional Basic”)
Version 1.6 (adjustment 3/1/2017, miscellaneous adjustments: more explanation within paragraph “Dimensional Basic”, remark concerning the by Einstein suggested cosmological constant, Fig 7.1 and 7.2 have been replaced by the new figure 7, description deuterium core in the paragraph “More Complex Particles”, extension of paragraph “Acknowledgement”)
Version 1.7 (adjustment 7/1/2017, introduction of paragraph “Electromagnetic Fields”, adjustment spin of the electron and the positron in figure 7. and another adjustment in the paragraph “Acknowledgement”)
Version 1.8 (adjustment 11/10/2017, textual adjustment: the dimensional basic is dark matter, adjustment in the Paragraph ‘Outline of observed conflicts within quantum mechanics’, further extension of the paragraph ‘dimensional basic’, several adjustments in using the terms ‘dark energy’ and ‘dark matter’, extracting formula (3) from text, adjustment in dark energy’s role on the expansion of the universe and a more subtle description of the cosmic background, adjustment in the paragraph ‘Acknowledgement.)

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